Gold in the News

Interesting news stories featuring gold

Scientist Awarded Grant for Cancer Research

A scientist researching the use of gold nanoparticles in cancer treatment has been supported with a grant from a US cancer research body.

Steven A Curley of the University of Texas MD Anderson Cancer Centre has been awarded a grant from the American Association for Cancer Research (AACR) for his work on carbon nanotubes and gold nanoparticles as radio frequency targets. Awards can be up to $250,000 and are specifically designed to help the research for new agents to treat the disease. Dr Curley hopes to join antibodies to nanotubes and gold nanoparticles, in order to bring about homing to inoperable metastases, which can then be ablated.

The grant awarded to Dr Curley highlights the growing significance of gold particles in the treatment of cancer. Another recent example is Dmitri Lapotko's research into the use of gold nanoparticles in microbubbles that could kill cancer cells, conducted at the Luikov Institute in Minsk.

Scientists Create Gold Buckyballs

Scientists at the Pacific Northwest National Laboratory in Richland and at the University of Nebraska have reported in *Science* that they have discovered hollow molecular structures made of pure gold, in effect, golden buckyballs.

Carbon buckyballs, hollow spheres made of 60 carbon atoms and named for the geodesic dome designed by Buckminster Fuller, were discovered in the early 1980s. Buckyballs became the third known natural form of pure carbon after diamond and graphite.

ILai-Sheng Wang said his team appears to have created the first metallic version of the buckyball. In order to look for golden buckyballs, Wang and his team used a laser to vaporise gold. The vaporised gold atoms condensed inside a vacuum and formed clusters varying in size from two to 100 atoms. They eventually were able to discern that only clusters of 16 to 18 atoms form hollow cages. In theory these golden buckyballs could be put to use as materials with novel chemical, magnetic or optical properties

Nanosphere to Launch Gold-based Genetic Testing Product

Nanosphere has raised $57 million in venture capital that will enable it to commercialize its first product later this year. Nanosphere plans to use the money to launch the Verigene System, which provides more sensitive genetic testing at a lower cost than conventional machines. The system, which enables doctors to check for a patient's predisposition for certain diseases, uses gold nanoparticles to identify genetic materials.

The company, which licenses the core gold nanoparticle technology from Northwestern University in Evanston, Illinois, has won government contracts to develop systems for detecting biological warfare agents. It also is developing systems for the commercial market that can carry out protein analysis for the early detection of Alzheimer's and other life-threatening diseases.

Gold-coated Stents Study Reports

A report from the West German Heart Centre, University Hospital Essen, in Germany has studied the surface modification of stents using pure gold as a biocompatible coating. The NIROYAL stent from Boston Scientific one of the last available gold coated stainless steel stents on the market, was different from previous gold-coated stents in that it featured high purity and a two-step plating process to ensure complete coating and to eliminate pores, flakes and cracks with stent expansion, exposing the underlying material. Optimal radiopacity was the most evident benefit of the NIROYAL stent.

Results of the trial indicated comparable acute and long-term outcomes of the NIROYAL and the NIR stent (stainless steel). Despite, the superiority of gold coating to uncoated stainless steel stents in vitro, the clinical results were considered disappointing, probably due to an incomplete gold coverage after stent expansion.

Gold-ceria Catalyst for Oxidation of Carbon Monoxide

A new patent from Philip Morris tobacco in Switzerland (WO 2006046145) has been published, related to a catalyst comprising gold nanoparticles on cerium oxide, which is catalytically active for oxidation of carbon monoxide at room temperature.

Heart Attacks Tested

Technology used to measure the concentration of DNA in a sample using gold nanoparticles has been adapted to measure concentrations of protein released by dying heart cells. At present, many heart attack victims are not treated since tests do not show tell-tale high levels of proteins released by the dying cells. The new technique could save lives.

Northwestern University scientist Chad Mirkin developed a

method of measuring DNA concentrations. He managed to coat gold nanoparticles with DNA strands that could be bound to complementary target DNA. These particles could also attach to a microarray bearing the complementary DNA and be scanned with a digital camera, revealing the DNA concentration.

Illinois nanotechnology company Nanosphere has now built a device making use of the same method to measure protein levels.

Medical applications for gold continue to be developed....

Gold-based Sensors to Allow Robots to 'Feel'

A sensor based on the use of gold nanoparticles has been reported in Science by Vivek Maheshwari and Ravi Saraf, of the University of Nebraska. It is claimed that the discovery will aid robotic surgery, allowing for unparalleled sensitivity of robotic arms.

In the sensor, touch is sensed through a "sandwich" of alternate layers of gold and cadmium sulfide nanoparticles with a thin plastic sheet on top and glass below. Based on the characteristics of the object felt, the image sensor beneath the glass recognizes the changes in electrical current and electroluminescence in the gold and cadmium sulfide nanoparticle layers.

Gold Nanoparticles Stabilise Enzymes

Gold nanoparticles can stabilise enzymes at air–water interfaces, enhancing their applications as biocatalysts.

Vincent Rotello and colleagues at the University of Massachusetts at Amherst, US, used gold particles as scaffolds to support and stabilise the enzyme chymotrypsin. Chymotrypsin catalyses hydrolysis reactions. Like other enzymes, chymotrypsin has a natural tendency to degrade at air–water surfaces, losing its structure and catalytic activity. Rotello and colleagues say the enzyme can be stabilised by surrounding it with monolayer-protected gold nanoparticles (MPNs).

Rotello said the findings are significant for technologies that use enzymes to catalyse reactions at air–water surfaces.

For more information see:
http://www.rsc.org/Publishing/ChemScience/Volume/2006/08/Nanoparticle_enzymes.asp